

3242

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2013

DEEE—THIRD SEMESTER EXAMINATION

DC MACHINES AND BATTERIES

Time : 3 hours]

[Total Marks : 80

PART—A

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *four* simple sentences.

1. List any four comparisons between lap and wave windings.
2. Classify DC generators based on their field excitations.
3. List the advantages of parallel operation of DC generators.
4. What are the requirements of voltage built-up in self-excited DC generators?
5. List the various losses of a DC motor.
6. What is the significance of back e.m.f.?
7. What is the necessity of starter for DC motors?
8. List the advantages and disadvantages of Ward-Leonard method.
9. Differentiate between primary and secondary cells.
10. What is meant by trickle charging?

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PART—B

- Instructions :** (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

- 11.** A DC shunt generator delivers 195A at a terminal voltage of 250 V. The armature resistance and shunt field resistance are 0.02 ohm and 50 ohm respectively. The iron and mechanical losses equal to 950 W. Find (a) e.m.f. generated and (b) full-load efficiency. 10
- 12.** (a) Derive the e.m.f. equation of a DC generator. 5
(b) Explain the active materials of nickel-iron batteries. 5
- 13.** Explain the commutation with neat sketches. 10
- 14.** (a) A 6-pole wave connected DC generator supplies armature current of 200 A. Determine the (i) demagnetizing ampere turns, (ii) cross-magnetizing ampere turns and (iii) number of series turns to balance demagnetizing effect. The number of conductors are 600, angle of lead is 6 degrees and leakage coefficient is 1.2. 6
(b) What is the necessity of equalizer bar? 4
- 15.** (a) Derive the relation between back e.m.f., flux and speed. 4
(b) A 220 V DC shunt motor takes 3 A on no-load. Field current is 1.0 A, armature resistance is 0.3 ohm. Find the output and efficiency when armature current is 20 A. 6
- 16.** Explain with neat diagrams the speed control of DC series motor. 10

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17. The Hopkinson's test results on two identical DC machines gave the following test results :

Supply voltage 500 V

Supply current 15 A

Generator output current 120 A

Generator field current 4 A

Motor field current 3 A

Armature resistance of each machine 0.06 ohm

Find their efficiencies. 10

18. (a) Explain the different methods of charging of batteries. 8

(b) Write the equation of A-H efficiency and W-H efficiency. 2
